

REMARKS

The statement by the Examiner that claims 20-24 are allowed and claims 5, 6, 8-10, 29, 30 and 32-34 contain allowable subject matter is gratefully acknowledged by the Applicant.

Claims 1, 14, 20, 25 and 39 have been amended for further clarity. Claims 13, 38 and 39 have been canceled. Claims 64-69 have been newly added. No new matter has been included. Claims 1-12, 14-37 and 60-69 are now pending in this application.

Claims 1-4, 7, 11-14, 25-28, 31, 35-39 and 60-63 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu et al. (U.S. Patent No. 5,912,836) ("Liu") in view of Applicant's Prior Art ("APA"). The rejection is respectfully traversed.

The present invention recites a pixel cell comprising "a photo-conversion device for producing photogenerated charges" and "a circuit for producing an output signal from said photogenerated charges." The circuit comprises "at least one transistor structure" comprising "at least two threshold voltages associated with the at least one channel region, and wherein a current-voltage characteristic of the transistor structure is determined at least in part by the threshold voltages." (Claim 1). Claims 25 and 39 recite similar limitations.

Applicant respectfully submits that it would not have been obvious to one of ordinary skill in the art to combine Liu with the APA, nor was there a motivation to do so to attain the claimed invention. APA teaches a conventional four transistor (4T) pixel cell having a photodiode. APA fails to teach or suggest a circuit for producing a pixel output signal, which comprises a transistor having "at least two threshold voltages associated with the at least one channel region, and wherein a current-voltage characteristic of the transistor structure is determined at least in part by the threshold

voltages," as recited in claim 1. The Office Action seeks to overcome these deficiencies by suggesting that it would have been obvious to modify the APA circuit by incorporating the teachings of Liu.

Liu, however, discloses a test structure that is capable of evaluating and monitoring the charge-gain and charge-loss behavior of a flash memory array. Liu has nothing whatsoever to do with imagers or pixel cells, which are disclosed in the APA, and on this basis alone there is no motivation to combine the two references which are from non-analogous arts. In addition, there is nothing in either reference to suggest combining the flash memory cell structure of Liu with structures of an imager pixel cell.

The crux of Liu is evaluating and monitoring the charge-gain behavior of flash memory cells, so that the true properties of various cell designs and processing techniques can be more accurately determined. (column 3, lines 27-34). Liu teaches that if a single test cell experiences significant charge loss and results in a lower threshold voltage, the sub-threshold characteristics of the cell transistor will exhibit a different behavior than that expected for a completely uniform distribution. This faulty condition is known as a leaky cell. Leaky cells will conduct current at a lower gate voltage before the main array will begin to conduct current at a target voltage. The resulting sub-threshold characteristics will show a kink in the overall I-V curve. (column 2, lines 33-60). Accordingly, Liu teaches that the two threshold voltages of the flash memory are a result of a faulty condition and are undesirable.

Therefore, there would be no motivation to use the faulty test cells described by Liu in combination with any teachings of the APA. Liu essentially teaches away from the Examiner's suggested combination since the problem addressed by Liu is not evidenced in the APA pixel circuit which has no operational characteristics similar to a flash memory cell. Additionally, Liu argues against combining itself with APA. Liu

seeks to correct a faulty condition by avoiding the creation of two threshold voltages whereas the claimed invention purposefully seeks to provide two threshold voltages. For at least these reasons, Applicant respectfully requests that the rejection be withdrawn and the claims allowed. Claims 2-4, 7, 11, 12, 14, 26-28, 31, 35-38 and 60-69 depend from claims 1, 25 and 39 and should be allowable along with claims 1, 25 and 39.

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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